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Claims
(Annex to the IPER)

1. A filter element for manufacturing tobacco smoke filters comprising a filtering material which substantially contains starch and/or a starch-based polymer mixture and comprises pores and/or filter channels being open in the direction of the gas flow, characterized in that the filtering material is arranged in alternatingly succeeding layers consisting of starch and/or a starch-based polymer mixture and activated carbon (21) and the layers are stacked transversely with respect to the direction of the gas flow.
2. The filter element according to claim 1 comprising preferably continuous filter channels extending substantially in the direction of the gas flow, wherein the diameter of the filter channels preferably lies in the range of 50 to 100 μm .
3. The filter element according to claim 1 or 2, wherein the starch and/or the polymer mixture form(s) a base material for activated carbon (21).
4. The filter element according to any one of claims 1 to 3, wherein the filtering material consisting of starch and/or a starch-based polymer mixture is a foamed material (20) or a fibrous material.
5. The filter element according to claim 4, wherein the foamed material (20) or the fibrous material forms a base material for an activated-carbon powder (21).
6. The filter element according to any one of claims 1 to 5 containing natural fibers such as cellulose fibers, hemp or cotton fibers preferably in an amount of about 5 percent by volume.
7. A method for manufacturing a filter element according to any one of claims 1 to 6 comprising the steps of:
 - (a) continuously supplying a metered mixture of starch and/or a starch-based polymer mixture as well as further additives into an extruder system,
 - (b) heating and kneading the mixture at a defined temperature and pressure regime for forming a melt,

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- (c) extruding the melt through a nozzle,
- (d) forming an extruded product having an air-permeable configuration,
- (e) compressing the extruded product and forming a filtering material as an endless filter (7),
- (f) separating the extruded filtering material into portions, and
- (g) forming a filter element (1) consisting of at least one filtering material portion.

8. A method for manufacturing a filter element according to any one of claims 1 to 6 comprising the steps of:

- (a) continuously supplying a metered mixture of starch and/or a starch-based polymer mixture as well as further additives into an extruder system,
- (b) heating and kneading the mixture at a defined temperature and pressure regime for forming a melt,
- (c) extruding the melt through a nozzle,
- (d) forming an extruded product having an air-permeable configuration,
- (e) compressing the extruded product and forming a filtering material as an endless filter (7),
- (f) separating the extruded filtering material into portions, and
- (g) forming a filter element (1) consisting of two or more filtering material portions and each comprising an activated carbon layer (21) between subsequent filtering material portions.

9. The method according to claim 7 or 8, wherein filter channels are introduced into the filtering material portions before forming the filter element (1).



10. The method according to claim 9, wherein the filter channels are formed by water jets, needles or a laser beam.
11. The method according to any one of claims 7 to 10, wherein the filtering material is formed of starch foam, biopolymeric films or starch polymer fibers.
12. The method according to any one of claims 7 to 11, wherein the further additives are polyvinyl alcohol, polyester amide and/or polyester urethane, polylactic acid (PLB), poly hydroxy butyric acid (PHB), a flowing assistant as well as optionally a foaming agent.

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